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INSECTS IN FARM-STORED WHEAT

How to Control Them

Leaflet No. 345

U.S. Department of Agriculture



INSECTS IN FARM-STORED WHEAT

—HOW TO CONTROL THEM

Wheat in a bin is like money in a vault . . .

Are you protecting your cash from insects?

If you have wheat in storage on your farm, make sure the bin is what it should be—a place where the wheat is protected and preserved. Don't let it be a place where weevils, grain borers, and other granary pests eat away the wheat—and your income.

Insects in farm-stored wheat cost American farmers millions of dollars every year. The loss is preventable. It is waste. It hits the farmer in two ways:

First, some of the wheat is destroyed by the insects.

Second, some of it is made unfit for milling. Infested wheat may bring only feed-grain prices at the elevator. Weevil-infested grain is not accepted by millers for processing into flour, cereal, and other food products.

Wheat seldom contains insects when it comes from the harvest field. The job is to keep it free of insects when it is stored. Do these things:

1. Clean bin thoroughly; make it tight and weatherproof before storing the wheat.
2. Spray inside surface of the bin with a residual insecticide.
3. Protect the wheat by applying a protective treatment or a fumigant.
4. Inspect the wheat regularly, and treat it when necessary.

PREPARATION OF THE BINS

Keeping insects out of wheat after it is stored is enough of a task. Don't make it harder by putting wheat into a bin where insects are waiting for it. Wheat is free from insects when it comes from the field; keep it that way.

Store wheat in metal bins that are easy to clean, or in properly constructed, weathertight wooden bins. The bins should be in a separate building. If a building in which grain is stored is constantly being entered for one purpose or another, it will be difficult to keep out rodents and birds.

In wooden bins, double walls and floors allow the accumulation of waste grain and grain dust that become infested with insects. They are difficult to combat under these circumstances.

Feed rooms or bins containing seed or poultry or animal feeds, stables,

mangers, and animal feeders harbor many insects that are likely to migrate to bins of grain. Wagons, trucks, combines, and other farm equipment containing accumulations of waste grain are all sources of infestation. Do not store grain near any of these danger points.

Clean out the bin at least a month before it is to be filled. Remove leftovers of old grain; sweep down the walls; sweep the floor. Remove accumulations of waste grain from under and around the bin. On the surface at least, the bin is now free from insects.

See what other places you can clean up, to prevent insects from migrating to the new grain. Clear trash and litter from bin area. Insects live from season to season around farm buildings in



N-10038

Sweep down the walls and ceiling.



N-10037

Sweep the floor.

spilled grain and accumulations of grain and feed. Cleaning up these places helps control not only insects, but also rats and mice.

Grainary pests like moisture with their grain. The less moisture stored wheat contains, the less attractive it is to insects.

Try to store the wheat when it is dry. If for some reason you have to store wheat with high moisture content, check frequently to see whether insects are developing in it. The more moisture there is, the closer you have to keep watch.

Once the wheat is stored, keep it

dry. To do this, you must have a tight, weatherproof bin.

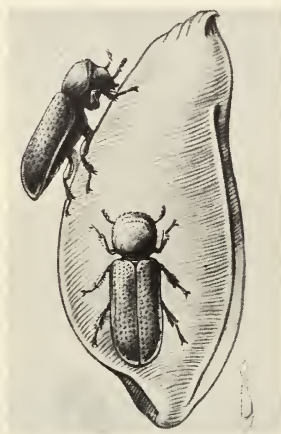
How about the roof and side walls? Will they keep out the rain and snow?

Can ground water and moisture get through the foundation and floor?

Will doors and windows keep out driving rain?

Does your bin have adequate ventilation?

Besides keeping out bad weather, tight construction keeps out rats, mice, and birds. If fumigation of the bin becomes necessary, tight construction makes that job easier and more effective.



BN-3062(C)

Adults of the lesser grain borer.



BN-3058(C)

Adult of the rice weevil.

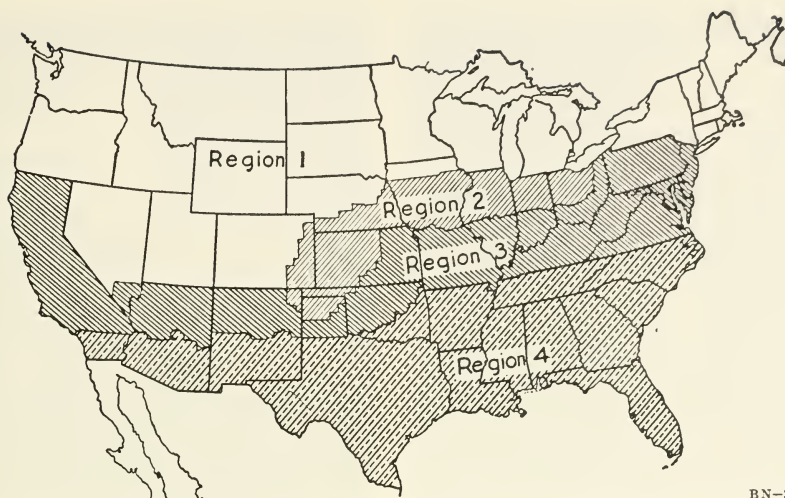
BIN TREATMENT

Insects may be living in cracks or burrows in the walls and floors of wooden bins, where your cleanup can't reach them. Destroy them with an insecticide.

Prepare a spray containing 2.5 percent of premium-grade malathion or methoxychlor, or 0.3 percent of pyrethrins in combination with 3 percent of piperonyl butoxide.

Buy one of these insecticides in the form of wettable powder or emulsifiable concentrate and mix it with water. The label will tell you how much to use for a spray containing the desired percentage of insecticide.

Apply the spray to all surfaces inside the bin. Apply it at the rate of 2 gallons to 1,000 square feet. Use a garden sprayer or a power sprayer.



BN-3889

The map shows, by regions, the degree to which farm-stored grain in the United States is subject to insect attack: Region 1, little if any damage occurs to wheat on the farm during the first season's storage. Region 2, insects may be troublesome during the first season. Region 3, insects are troublesome every year. Region 4, insects are a serious problem throughout the storage period.

GRAIN TREATMENT

When you are satisfied that the bin will keep the wheat dry, and that insects in it and near it have been destroyed, there is a further step that you can take to ward off insect infestation.

Apply a protective spray or dust to the wheat before it is stored or as it goes into the bin. Or fumigate the wheat after it is in the bin. The materials are sold where other agricultural chemicals are sold.

Protectants

Protective sprays or dusts applied to clean wheat at the time of storage prevent insect infestation for about one season. These sprays and dusts may be considerably less effective and for a shorter time in region 4 (see map) than in the other regions.

The protective sprays are premium-grade malathion or pyrethrum plus piperonyl butoxide. These insecticides are available as ready-to-use formulations or as concentrates to be mixed

with water. Use them as directed on the manufacturer's label. The Food and Drug Administration has established tolerances of 8 parts per million (p.p.m.) for malathion, 3 p.p.m. for pyrethrins, and 20 p.p.m. of piperonyl butoxide in wheat.

The protective dusts are premium-grade malathion or the pyrethrins in combination with piperonyl butoxide in wheat dust.

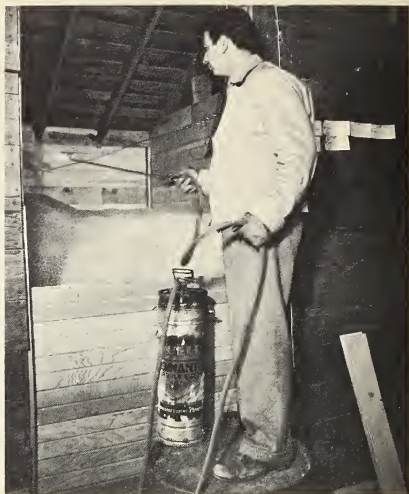
Both sprays and dusts can be applied to the grain at various times before it goes into the bin—as it comes from the combine, or as it is unloaded at the bin.

Several types of sprayers are available for applying these sprays. Some are simple hand sprayers that are easily operated. Others have cylinders of compressed air or motor-driven pumps. (For methods and equipment for applying protective sprays and dusts to grain, see "Method and Equipment for Bulk Treatment of Grain Against Insects," U.S. Department of Agriculture Marketing Bulletin No. 20.)



N-12680

Applying protective spray to wheat as it is binned.



BN-3753

Applying fumigant to farm-stored wheat with a hand sprayer.

Surface Sprays and Dusts

Insecticidal sprays or dusts can be applied to the surface of stored wheat to control moth infestation, to supplement protective treatments, or to help prevent insects from entering the grain. Surface treatments, however, do not

control any insect infestation already established below the surface of the grain.

Premium-grade malathion and pyrethrum in combination with piperonyl butoxide are approved for use in surface sprays and dusts. Follow the manufacturer's directions carefully.

FUMIGANTS

Kinds and Dosages

Fumigants are sold under various trade names. The ingredients are shown on the labels. The label on the fumigant you buy will probably show that it is one of those listed in the table that follows.

The table shows the ingredients in some readily available fumigants, the recommended dosage for each fumigant, and the established tolerances.

Several other suitable fumigants are available. If you use one not on the list given here, follow the manufacturer's dosage recommendations.

How To Fumigate

First, level the surface of the wheat in the bin.

Then apply the fumigant as a coarse spray over the surface. Apply it evenly.

Small quantities of stored wheat can be fumigated quickly and effectively by applying the fumigant with a garden sprayer or a bucket-pump sprayer. If you use a garden sprayer—

Enlarge the opening in the spray disk to the diameter of an 8-penny nail; or

Fumigant	Dosage per 1,000 bushels	
	Wheat in wooden bin	Wheat in metal or concrete bin
	<i>Gal.</i>	<i>Gal.</i>
Carbon tetrachloride (100%)-----	6	3
Carbon tetrachloride (80%)+carbon disulfide (20%)-----	4	2
Ethylene dichloride (75%)+carbon tetrachloride (25%)-----	6	3
Carbon tetrachloride (60%)+ethylene dichloride (35%)+ethylene dibromide (5%) ¹ -----	4	2

¹ A tolerance of 50 parts per million has been established as the maximum permissible residue of inorganic bromide on grain resulting from its fumigation with ethylene dibromide. Grain treated with ethylene dibromide should be thoroughly aerated before it is fed to poultry.

Carbon tetrachloride, ethylene dichloride, and carbon disulfide have been exempted from the need for a tolerance by the Food and Drug Administration.

Remove the spray nozzle and substitute a nozzle made of a pipe one-fourth inch in diameter and 6 inches long; flatten the spray end.

To fumigate a large quantity of wheat, use a power spray pump that will take the fumigant directly from the container in which it is purchased.

All pump fittings should be of bronze, which resists the corrosive action of fumigants. Hoses and

gaskets should be of plastic or synthetic rubber.

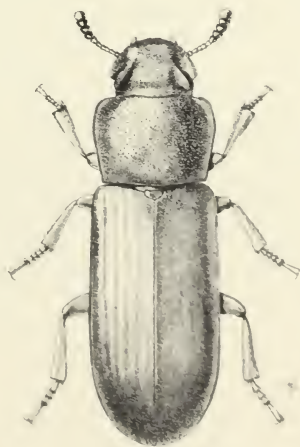
When To Fumigate

Fumigate within 2 weeks after binning the wheat if you live in region 4, and within 6 weeks if you live in region 2 or 3. If you live in region 1, fumigate when necessary to prevent insect buildup.



BN-3084(C)

Adult of the saw-toothed grain beetle.



BN-3090

Adult of the confused flour beetle.

REGULAR INSPECTION

About every 30 days take standard probe samples from the center of the bin and inspect them for insects.

Sift the sample through a 10- to 12-mesh screen. The screen will hold back the wheat, but insects will sift through.

Fumigate at once if you find even one granary weevil, rice weevil, or lesser grain borer per quart sample of

wheat, or as many as five insects of other kinds (such as flour and grain beetles, cadelles, or grain moths) per quart sample. The fumigation procedure is the same as that described on page 6.

After applying the fumigant evenly over the entire surface, give an extra treatment to any areas where insects are especially numerous.

PRECAUTIONS

Insecticides and fumigants are poisonous to man and animals. Use them only when needed and handle them with care. Follow the directions and heed all precautions on the labels.

Some pesticides used for protecting seed wheat are deposited in meat, fat, or milk when fed to animals. Never mix seed wheat containing such chemicals with market wheat—the whole lot may be condemned.

Keep insecticides or fumigants in closed, well-labeled containers in a dry place. Store them where they will not contaminate food or feed, and where children and pets cannot reach them.

Always apply fumigant from outside a grain bin.

Avoid repeated or prolonged contact of insecticide or fumigant with the skin. Avoid inhalation of fumi-

gant vapors or insecticide dusts or mists.

Avoid spilling insecticide or fumigant on your skin, and keep it out of the eyes, nose, and mouth. If any is spilled on skin or clothing, wash it off the skin and change clothing immediately.

When handling insecticide, wear clean, dry clothing.

Wash your hands and face before eating or smoking and immediately after completing insecticide application.

To protect fish and wildlife, do not contaminate lakes, streams, or ponds with insecticide. Do not clean spraying equipment or dump excess spray material near such water.

Empty containers are particularly hazardous. Burn empty bags and cardboard containers in the open or bury them. Crush and bury bottles or cans.

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